

## **Prospective and Retrospective Life-Charting in Posttraumatic Stress Disorder (The PTSD-LCM): A Pilot Study**

**Elizabeth A. Osuch,<sup>1,5</sup> Melissa A. Brotman,<sup>2</sup> Daniel Podell,<sup>1</sup> Marilla Geraci,<sup>1</sup>  
P. Lynn Touzeau,<sup>3</sup> Gabriele S. Leverich,<sup>1</sup> Una D. McCann,<sup>4</sup>  
and Robert M. Post<sup>1</sup>**

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*The purpose of this study was to design and conduct a pilot analysis evaluating the utility of a longitudinal, graphic approach to the symptoms of posttraumatic stress disorder (PTSD). Representative patients were instructed in the use of a daily prospective life-chart; they were interviewed and their past medical records were examined for monthly retrospective life-charting. The life charts were used to record life events, activating and inhibiting PTSD symptoms, comorbid symptoms, and treatment. Patients readily completed the prospective life-chart and retrospectively rated symptoms associated with traumatic and nontraumatic life events. Life-charting facilitated longitudinal depiction of the relationship of life experiences to PTSD symptoms and comorbidities, and the tracking of responses to medications.*

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**KEY WORDS:** PTSD; life-chart; retrospective; prospective; longitudinal symptoms.

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### **Introduction**

The life-chart method is a way of illustrating the relationship of life events and treatment interventions to the longitudinal course of illness. It can be traced back to

<sup>1</sup>Biological Psychiatry Branch, National Institute of Mental Health, National Institutes of Health, Bethesda, Maryland.

<sup>2</sup>University of Pennsylvania, Department of Psychology, Philadelphia, Pennsylvania.

<sup>3</sup>Saint George's University School of Medicine, Grenada, West Indies.

<sup>4</sup>Department of Psychiatry, Johns Hopkins School of Medicine, Baltimore, Maryland.

<sup>5</sup>To whom correspondence should be addressed at Department of Psychiatry, USUHS, 4301 Jones Bridge Road, Bethesda, Maryland 20814; e-mail: eosuch@usuhs.mil.

Emil Kraepelin, and was introduced into American psychiatry by Adolf Meyer in 1919. Life-charting has been used in recurrent affective disorders (Leverich & Post, 1998), panic disorder (Uhde et al., 1984), schizophrenia (Harding, McCormick, Strauss, Ashikaga, & Broods, 1989), and more generally (Rahe, 1992). Bremner, Southwick, Darnell, and Charney (1996) investigated the retrospective course of posttraumatic stress disorder (PTSD) and alcohol and substance abuse among Vietnam veterans.

Life-charting is of particular importance in PTSD because this disorder involves the long-term effect of life events on a patient's symptomatology, can wax and wane dramatically over time, and frequently overlaps with comorbid entities (other anxiety disorders, alcohol and substance abuse, affective disorders). Accurate depiction of course of illness may yield clues about the natural history, underlying neurobiology, and phase-related responses to treatment. In this study we retrospectively and prospectively life-charted seven patients with chronic PTSD to determine the feasibility of such a process in complicated subjects. Three representative cases were chosen for presentation.

## Methods

### *Subjects*

Consecutively admitted PTSD subjects, who were recruited as participants in a treatment trial using transcranial magnetic stimulation for PTSD symptoms, were invited to complete the retrospective and prospective life-charts. Written informed consent by each subject included permission for extensive assessment of past history and present symptoms. Prior to manuscript submission, subjects reviewed their completed life charts and case histories, as presented here, and gave written informed consent for their publication. Subjects (five women and two men) had a variety of traumatic experiences including childhood sexual or physical abuse or both, adult rape or assault or both, Vietnam combat trauma, and a structural-engineering disaster. Ages ranged from 24 to 56. Mean time since index trauma was 24.9 years (range = 5–37,  $SD = 10.9$ ). Demographic information was obtained and subjects were formally interviewed using the Schedule for Affective Disorders and Schizophrenia, Lifetime Version, Modified for Anxiety Disorders. In addition to PTSD, subjects had the following lifetime diagnoses: depression ( $n = 7$ ), panic disorder ( $n = 6$ ), and substance abuse ( $n = 7$ ). Patients had been in psychiatric treatment for an average of 9.0 years (range = 1–36,  $SD = 12.1$ ). Number of years of education ranged from 10 to 17 with a mean of 13 ( $SD = 2.31$ ), or just beyond high school. None of the subjects had significant cognitive impairments, although most had impaired concentration from their psychiatric disorder(s).

### *Instruments*

Each subject was interviewed using the life charts designed specifically for PTSD. Life events were recorded and scored for subjective impact, ranging from strongly positive (+4) to strongly negative (−4). Severity of each patient's "positive" and "negative" symptoms of PTSD (analogous to positive and negative symptoms of schizophrenia or mania and depression in bipolar disorder) were graphically recorded. Positive symptoms involved those in the spectrum of intrusion and arousal with either subjectively or physiologically activating characteristics or both. These included nightmares, flashbacks, intrusive thoughts, irritability or angry outbursts, hyperarousal, hypervigilance, hyperstartle, and panic attacks. Negative symptoms were those that involved a diminution of the subjects' experiential world: avoidance of reminders of the event, decreased interest in significant activities, inability to experience normal emotions, feelings of detachment, numbness, and foreshortened future. The symptoms of PTSD were simplified into these two general categories to facilitate recall and rating of their severity. PTSD symptoms were subjectively reported as mild, moderate, or severe in retrospective charting.

In the prospective, self-rated version, the moderate severity category was divided into low and high moderate, reflecting greater accuracy and ability of patients to make this determination with prospective assessment, as compared with that by retrospective assessment. This parallels the method validated in the NIMH-LCM for affective disorders (Denicoff et al., 2000). In addition to symptoms of intrusion/arousal and avoidance/numbing, the prospective life-chart tracked hours of sleep per night, presence of nightmares, and number of flashbacks per day.

In addition to the primary PTSD symptoms, several comorbid symptoms were assessed on a 5-point scale with 0(*none*), 1(*mild*, e.g., few symptoms, no significant impairment in functioning), 2(*low moderate*, e.g., some clear symptoms, some impairment), 3(*high moderate*, e.g., many symptoms, great impairment), and 4(*severe*, e.g., severe, uncontrollable symptoms; unable to function; hospitalized). For the retrospective monthly chart, comorbid symptoms included substance abuse, depression, and functional impairment. Prospectively rated comorbid symptoms were pain/fatigue, depression, substance use, irritability, dissociative symptoms and anxiety/panic attacks. Although some of these overlap with primary PTSD symptoms, their potential prognostic importance and independent variation from the core intrusion/arousal and avoidance/numbing symptoms of PTSD suggested the utility of tracking them systematically over time. Both versions of the life chart included space for "Other Comorbid Symptoms" to be completed at the discretion of the interviewer. Medication and other forms of therapy were charted in the same temporal domains. Retrospective recall was validated with information obtained from medical records or family members or both.

## Results

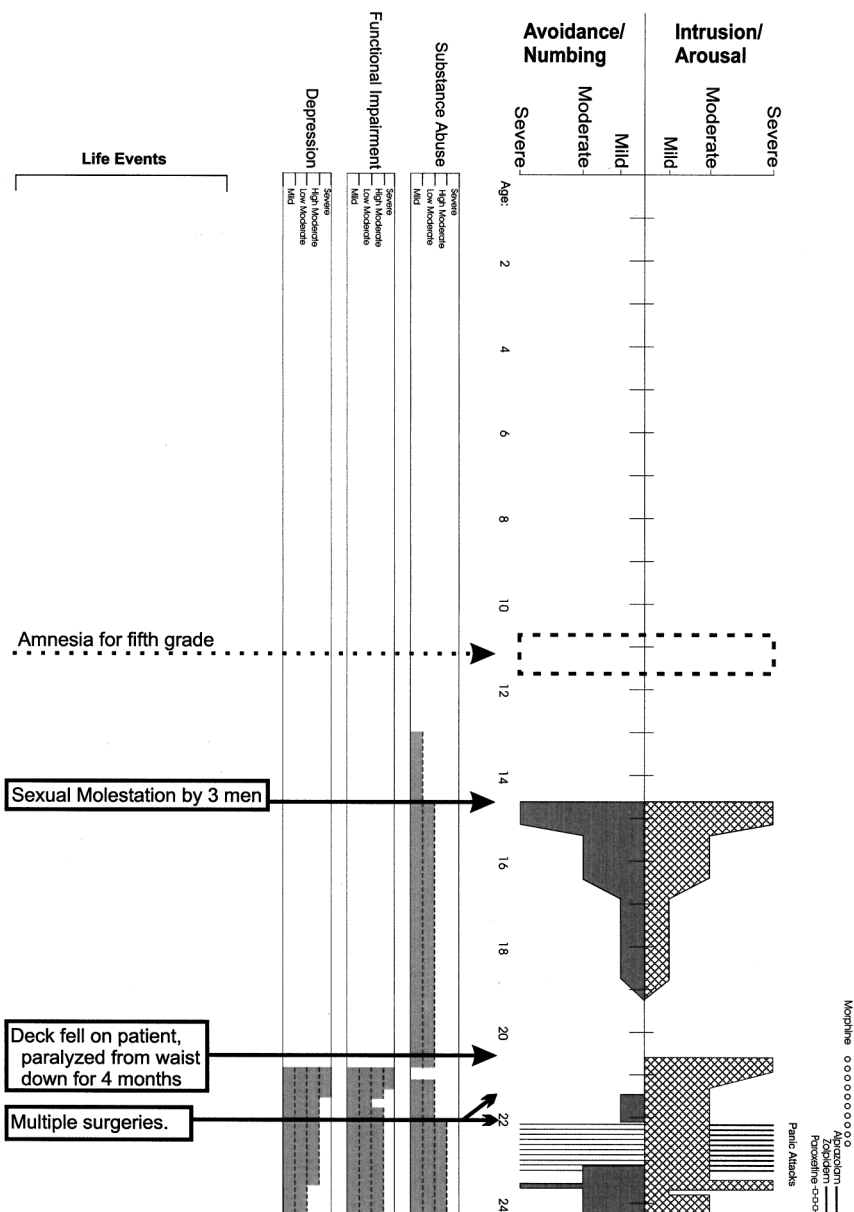
### *General Results*

All seven subjects were able to utilize the prospective life-chart and to help the interviewer complete the retrospective life-chart. Although a few subjects found it challenging to keep up the daily, prospective version because it “reminded” them of their illness, most were highly invested in recording their symptoms. Subjects varied in their ability to recall events, symptoms, and medications from the past for the retrospective chart, and the use of old records was valuable as an aid to memory. One subject with a long history of borderline personality characteristics and moderate dissociative symptoms had the greatest difficulty with the retrospective chart. Most subjects had no difficulty recalling past events and responses to events, and appreciated the process of charting their illness course in its entirety. The time required to complete the retrospective life-chart varied, depending on the age and complexity of the subject and on his/her ability to focus on the task. The longest took several hours of interviewer time over several sessions. The shortest involved a subject who choose to take the chart home and complete it by himself, then review it with the clinician. Each patient had a unique portrait of his/her course of illness. Three representative patterns are described below.

### *Case 1: Acute Onset, Recurrent PTSD After Discrete Traumas (Fig. 1)*

This female patient in her mid-twenties had been a victim of an engineering disaster that crushed her from the waist down, and trapped her for several hours, 5 years prior to study. She had immediate onset, severe intrusion/arousal symptoms. Her first avoidance/numbing symptoms developed almost 1 year after the event. By 2 years post-trauma, she had both severe intrusion and withdrawal symptoms, including severe panic attacks several times per week (on a baseline of moderate positive PTSD symptoms) and near complete social withdrawal. This is symbolized by the closely spaced lines on each pole of the symptom severity graph. Her functional impairment remained high moderate. Substance abuse increased to high moderate with alcohol intake several times per week in her attempt to decrease intrusion/arousal symptoms. Depressive symptoms reached a peak shortly after multiple operations when she was paraplegic and told (incorrectly) that she would never walk again.

The patient had a prior episode of PTSD, which was uncovered and fully described only with retrospective life-charting. The subject had been sexually molested by three men while intoxicated at a party. Furthermore, the systematic process of life-charting also revealed, for the first time, a period of almost complete amnesia for approximately 1 year when the patient was in the fifth grade. She demonstrated excellent recall for earlier and subsequent ages.



**Fig. 1.** Acute Onset Posttraumatic Stress Disorder (PTSD) After Discrete, Recurrent Traumatic Events. Intrusion/Arousal symptoms appear above, and Avoidance/Numbing symptoms below a timeline, indicating patient age. These symptoms are graded as mild, moderate, or severe. Recurrent panic attacks with resultant severe social withdrawal is indicated by repeated vertical lines on both sides of the time line. Below the time line, substance abuse, functional impairment, and depression are represented on a mild, low moderate, high moderate, and severe scale. Relevant life events (sexual molestation, index trauma, and multiple operations) are recorded beneath this. Medications are indicated at the top of the chart above PTSD symptoms. A period of amnesia is indicated by broken lines.

*Case 2: Delayed Onset PTSD in a War Veteran (Fig. 2)*

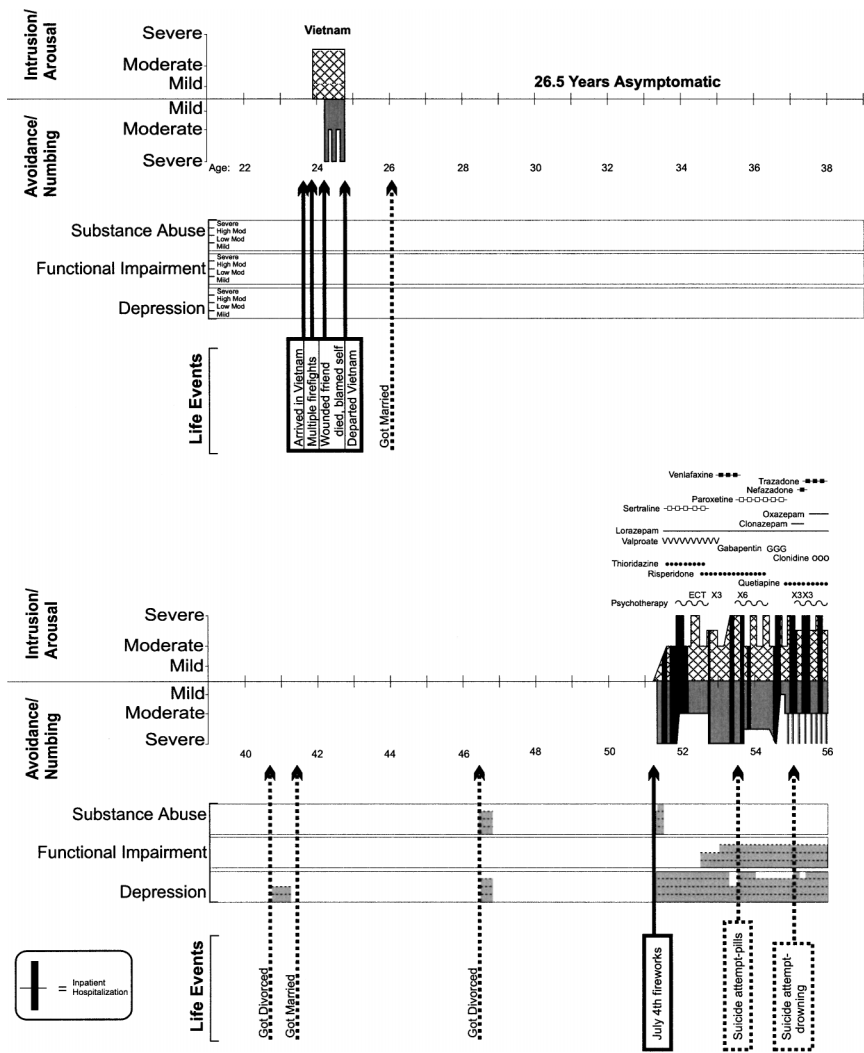
This man in his mid-fifties was a Vietnam veteran. He reported both intrusion/arousal and avoidance/numbing in the war, after an incident when he was wounded and his commanding officer was killed. After the war, he reported no symptoms except brief depressive episodes and substance abuse around the time of divorces. Over 25 years later at the age of 52, after a July 4th fireworks display, he began having moderate to severe PTSD symptoms with comorbid depression and alcohol use. He was hospitalized 10 times (solid black areas on the life-chart) and had two serious suicide attempts. Ineffective treatment interventions, as depicted, included many medications, psychotherapy, and electroconvulsive therapy. Ultimately, at the NIMH (not illustrated), he had near complete remission of his PTSD symptoms with the combination of quetiapine, lamotrigine, venlafaxine, naltrexone, and psychotherapy.

*Case 3: Chronic Course of PTSD Following Multiple Childhood and Adult Traumas (Fig. 3)*

This patient in her early thirties reported multiple early traumas including childhood sexual molestation by her grandfather, adolescent rape, and physical assaults by her brother and father. She recognized PTSD symptoms of intrusive thoughts, nightmares, fear, avoidance, numbing, dissociation, depression, and functional impairment (in school and socially) beginning with the onset of the molestation and continuing with intermittent exacerbation throughout her life. Her substance abuse also began early. Two spontaneous abortions in quick succession led to a rapid decline in her functioning and her first hospitalization (first solid black area). This chart depicts the varied but persistent symptomatic course of a subject who had multiple early traumatic stressors with periods of exacerbation from which she partially recovered before adult life stressors led to a downhill decline and contact with the mental health system.

*Case 3 (Continued): Prospective Life-Chart and Effect of Treatment Interventions (Fig. 4)*

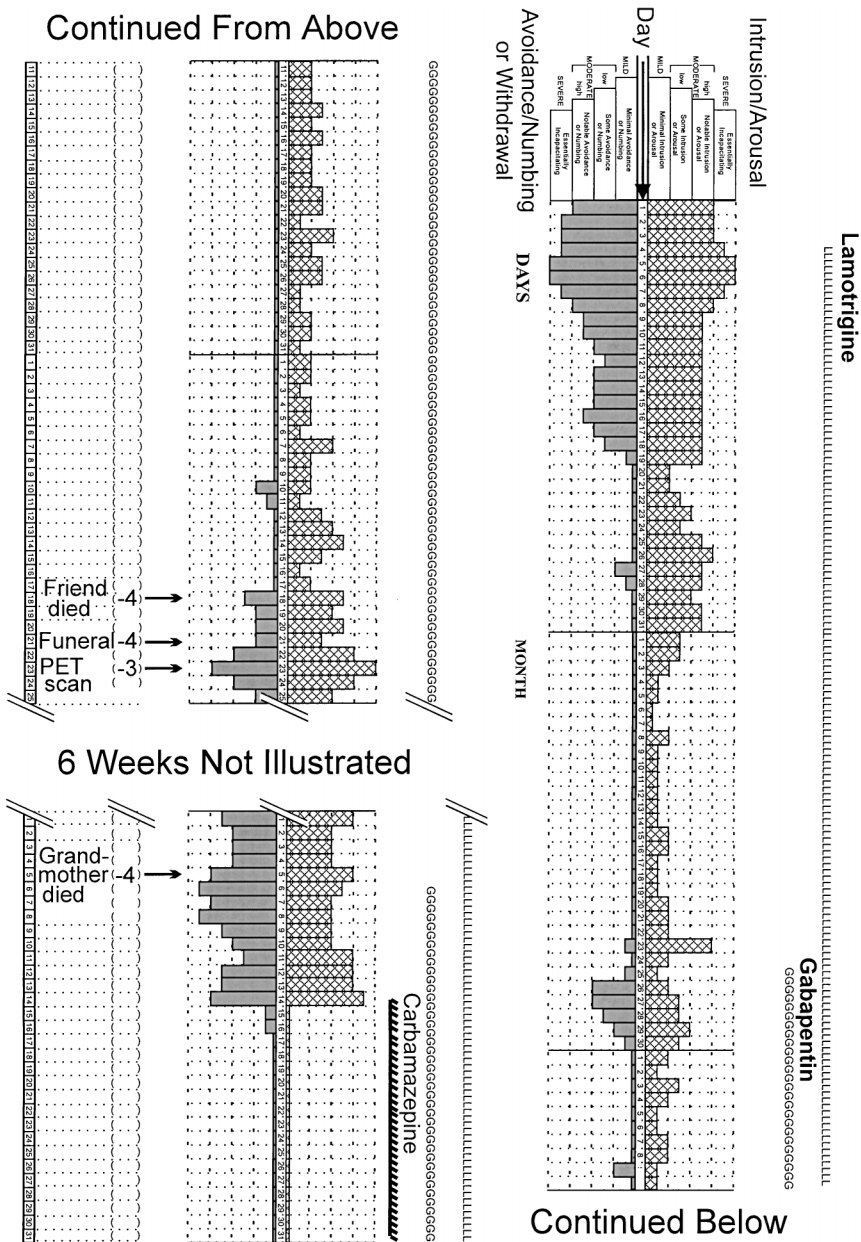
The subject in Case 3, above, elected to participate in a double-blind, randomized crossover treatment trial of lamotrigine and gabapentin for her affective disorder (Frye et al., 2000). An illustrative portion of her daily prospective life-chart is shown in Fig. 4. As can be seen, she had a good response to blinded lamotrigine, which persisted on gabapentin, with breakthrough symptoms around stressful life events. Finally, in treatment optimization, the addition of carbamazepine to lamotrigine and gabapentin led to complete resolution of her symptoms, both affective and posttraumatic.



**Fig. 2.** Delayed Onset of PTSD in a Vietnam veteran. Brief symptoms during the Vietnam war were followed by 26.5 years without PTSD symptoms. Symptoms were then initiated by a fireworks celebration, which led to worsening PTSD and depressive symptoms and functional impairment. Repeated hospitalizations are indicated by solid black bars over the symptom severity graphic. Life events not directly leading to PTSD symptoms are indicated by broken lines. Multiple treatment interventions are shown.







**Fig. 4.** Prospective Life-Chart and Effect of Treatment Interventions. The subject in Fig. 3 undertook a double-blind treatment trial of lamotrigine and gabapentin, which is partially shown here. Only PTSD symptoms, treatment interventions, and difficult life events are illustrated. After a good response to lamotrigine, the patient showed some worsening during several months of gabapentin treatment. After completion of the study, during treatment optimization, she had complete resolution of symptoms with the addition of carbamazepine to blind lamotrigine and gabapentin, as seen in the data for the last 2 weeks shown in the chart.

## Discussion

The PTSD Life-Chart Method (PTSD-LCM) provided a comprehensive picture of the longitudinal progression and resolution of PTSD symptoms and comorbidities in relationship to life experiences and responses to treatment. Because of its systematic, longitudinal approach, retrospective life-charting facilitated a detailed portrait of patients' histories and, in one instance, revealed a prior traumatic event and a period of amnesia not initially evident or reported.

The life charts illustrated diverse presentations of the illness architecture such as PTSD after discrete traumatic events, delayed onset following war trauma, and chronic PTSD from repeated early traumatic experiences. The continuity of retrospective and prospective life-charts enabled the clinician or researcher to place the entire evolving course of illness and response to treatment into lifelong context. The prospective life-chart was particularly helpful for tracking symptom response to therapeutic interventions. It revealed both gradual as well as rapid and dramatic changes over the course of months (Fig. 4).

This type of longitudinal evaluation has value as a research method and as a clinical tool for illustrating an individual's symptoms and responses to treatment, as well as providing a concise, transferable medical record. Such a vehicle will facilitate transitions of care across different programs, care providers, and consultants, thereby potentially saving the time spent on its initial completion. It may also form a longitudinal template for considering stages of illness progression and the therapeutic interventions specific to each stage.

Retrospective life-charting has the liabilities of depending on patients' recall (as supplemented by other input) and being time consuming. Nevertheless, we suggest the utility of such a detailed approach as part of the initial phases of intake and therapy. Once completed, a life chart provides a concise longitudinal condensation from which to consider psychotherapeutic and pharmacotherapeutic options.

Prospective life-charting is a structured, daily, self-report instrument and depends on the patient's ability to assess a variety of symptom severities that do not have precisely delineated cutoffs, and to report them accurately. It is our experience that instruction from a mental health provider and a minimum of practice results in a rapidly completed, user-friendly tool. Pilot experience with this instrument suggests its applicability and utility. Formal reliability and validity studies of both PTSD life-chart assessments appear indicated.

## References

- Bremner, J. D., Southwick, S. M., Darnell, A., & Charney, D. S. (1996). Chronic PTSD in Vietnam combat veterans: Course of illness and substance abuse. *American Journal of Psychiatry*, 153(3), 369-375.

- Denicoff, K. D., Leverich, G. S., Nolen, W. A., Rush, A. J., McElroy, S. L., Keck, P. E., Suppes, T., Altshuler, L. L., Kupka, R., Frye, M. A., Hatef, J., Brotman, M. A., & Post, R. M. (in press). Validation of the prospective NIMH-Life-Chart Method (NIMH-LCM<sup>TM</sup>-p) for longitudinal assessment of bipolar illness. *Psychological Medicine*.
- Frye, M. A., Ketter, T. A., Kimbrell, T. A., Dunn, R. M., Speer, A. M., Osuch, E. A., Luckenbaugh, D. A., Cora-Locatelli, G., Leverich, G. S., & Post, R. M. (in press). A placebo controlled study of lamotrigine and gabapentin monotherapy in refractory mood disorders. *Journal of Clinical Psychopharmacology*.
- Harding, C. M., McCormick, R. V., Strauss, J. S., Ashikaga, T., & Brooks, G. W. (1989). Computerised life chart methods to map domains of function and illustrate patterns of interactions in the long-term course trajectories of patients who once met the criteria for DSM-III schizophrenia. *British Journal of Psychiatry*, 155(5), 100–106.
- Kraepelin, E. (1990). *Manic-depressive insanity and paranoia*. (R. M. Barclay, Trans.-Rep. Ed.). Salem, N. H.: Ayer Company Publishers.
- Leverich, G. S., & Post, R. M. (1998). Life charting of affective disorders. *CNS Spectrums*, 3(5), 21–37.
- Meyer, A. (1919). The life chart and the obligation of specifying positive data in psychopathological diagnosis. From *Contributions to medical and biological research: Vol. 2. Hoeber*. In E. E. Winters (Ed.), *The collected papers of Adolf Meyer* (reprinted, 1951). Baltimore: John Hopkins Press.
- Rahe, R. H. (1992). Van Gogh and the life chart. *Integrative Physiological and Behavioral Science*, 27(4), 323–335.
- Uhde, T. W., Boulenger, J. P., Roy-Byrne, P. P., Geraci, M. F., Vittone, B. J., & Post, R. M. (1984). Longitudinal course of panic disorder: Clinical and biological considerations. *Progress in Neuropsychopharmacology Biological Psychiatry*, 9, 39–51.